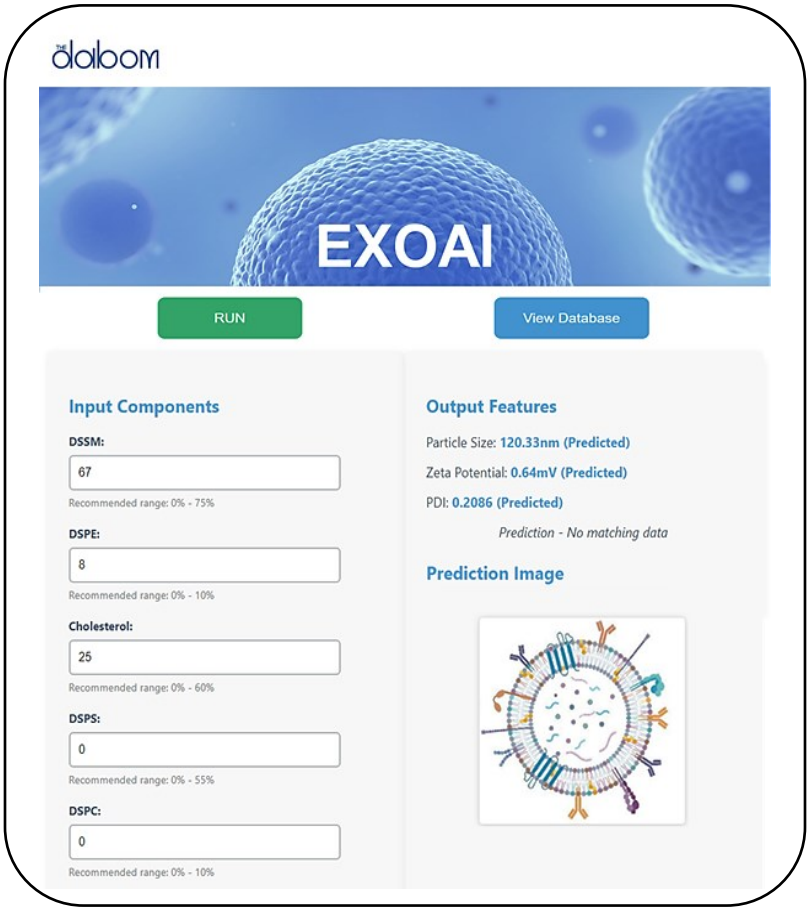
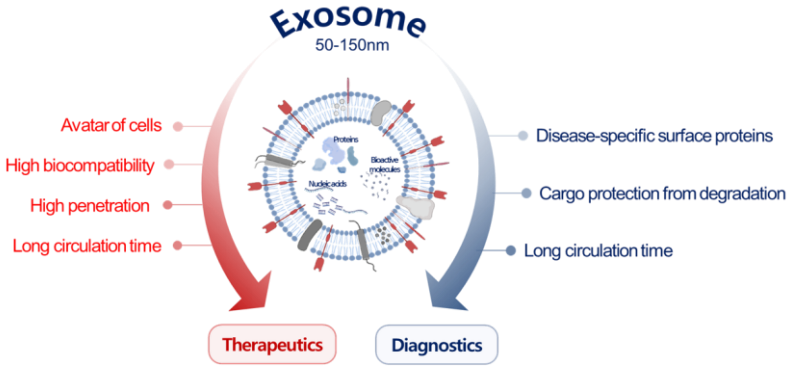
EXOAI™

: AI-driven extraordinary lipid nanoparticles composition prediction platform



Extraordinary lipid nanoparticles Overview

What is extraordinary lipid nanoparticles?



■ Extraordinary lipid nanoparticles are naturally secreted nanovesicles that hold immense promise as a therapeutic biomaterial due to their excellent biocompatibility, high cellular permeability, and extended stability.

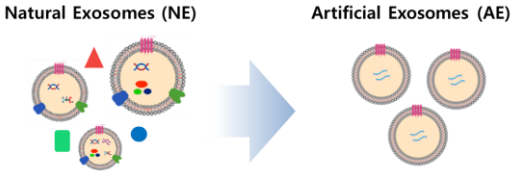
■ Furthermore, their unique cargo of disease-specific proteins and molecules makes them highly valuable for diagnostic applications.

What is “extraordinary lipid nanoparticles”?

■ **Extraordinary lipid nanoparticles (EXOLNPs)** are next-generation biopharmaceuticals engineered to closely replicate the lipid composition and membrane proteins of natural exosomes.

■ While natural exosomes offer various advantages, their production requires cell cultivation, isolation and purification processes, making large-scale manufacturing difficult and leading to batch-to-batch heterogeneity.

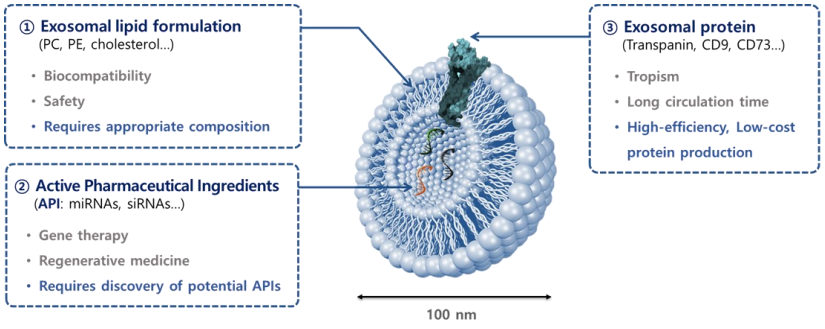
■ EXOLNP combines the key benefits of natural exosomes, such as **extended circulation time, tropism, and low toxicity.** Through overcoming their inherent limitations of natural exosome -like heterogeneity and low productivity -, EXOLNP is **homogeneity and scalability** for next-generation therapeutics.



Common Advantages	**Long Duration Time in the Human Body**	
	Natural Targeting	
	Low Toxicity/Immunogenicity	
Production Process	Biological production via Upstream/Top-down methods	Bio-Physical/Chemical/Mechanical Production via Downstream/Bottom-up methods
CMC	Difficult to achieve consistency/uniformity due to biological production	Successful CMC through continuous microfluidic production
Production Time	More than 24 hours (requires cell culture)	Less than 3 hours (artificial synthesis without cell culture)
Cost	High cost (cell culture, sepration and enrichment)	Lost cost (minimal separation, enrichment and purification)
Safety	Low safety due to unstable CMC	High safety due to successful CMC and natural exosome mimicry
Scalability	Limited due to its biological origin	Expandable to various drugs and indications

The Necessity of Artificial Intelligence in Exosome Formulation

Key Technologies for Artificial Exosome Production



■ To produce artificial exosomes, it's crucial to identify the optimal compositional ratios of lipid components, active pharmaceutical ingredients (APIs), and exosomal proteins, tailored to the target organ and disease.

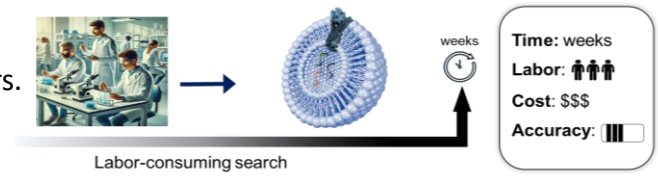
■ Among these, finding the optimal lipid composition is paramount, as it directly impacts biocompatibility and stability.

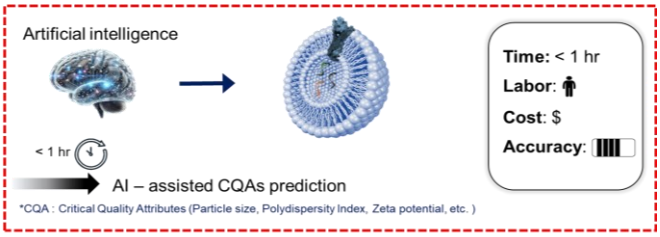
Advantage of AI-driven EXOLNP fabrication

■ Manually exploring the varied lipid compositions required for specific target organs and diseases demands considerable **time and cost** from researchers.

■ Consequently, an efficient method for identifying the **optimal lipid composition ratio** is crucial for streamlining artificial exosome production.

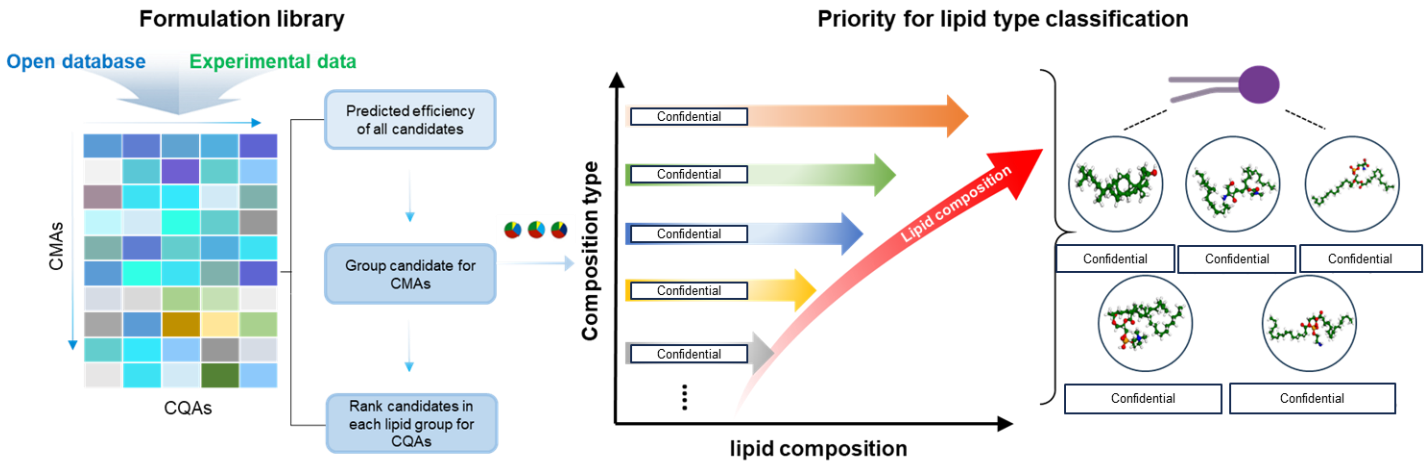
■ Utilizing **artificial intelligence (AI)** for this optimal composition search can significantly **reduce time, labor, and associated costs**.



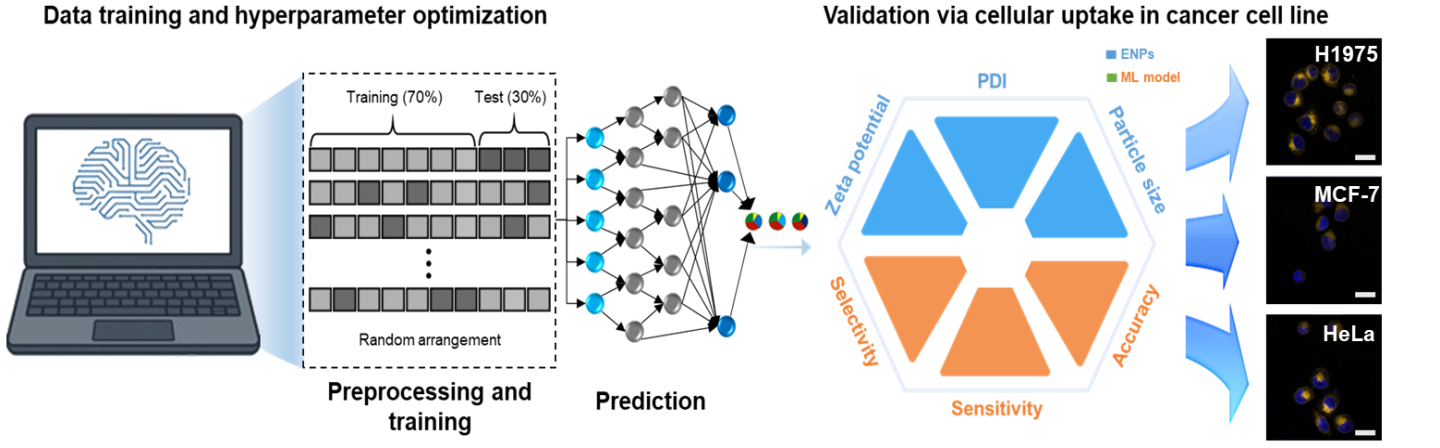


Case study: Data processing and Training

Step 1: Data processing for top-ranked CMAs for EXOLNPs

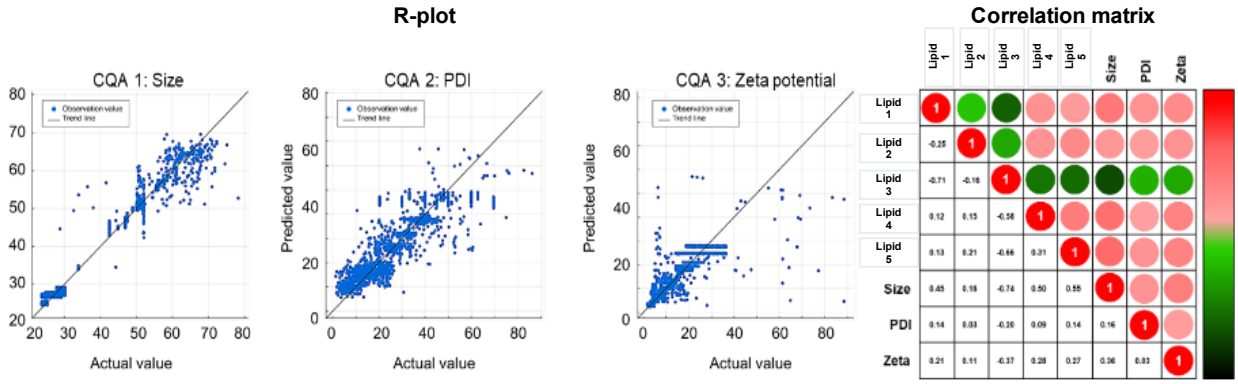


Step 2: Training and validation via ML model

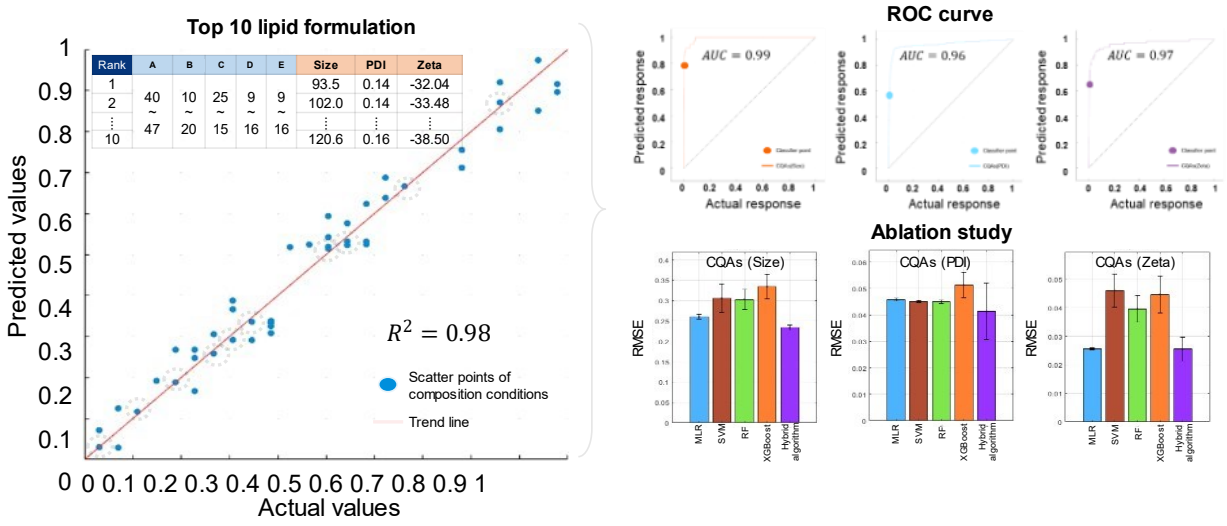


Case study: AI-driven prediction

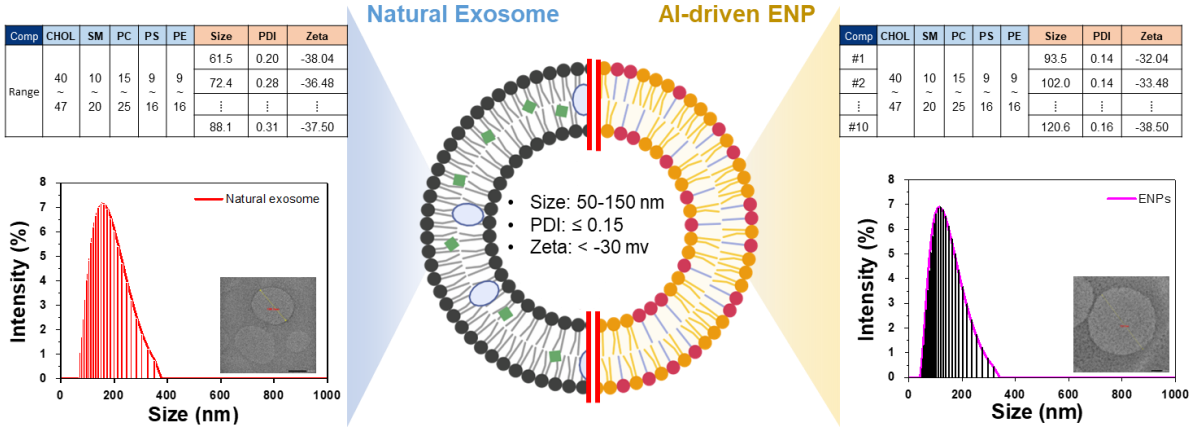
Training results for CQAs regarding lipid formulation



Test results: Performance evaluation of hybrid algorithm

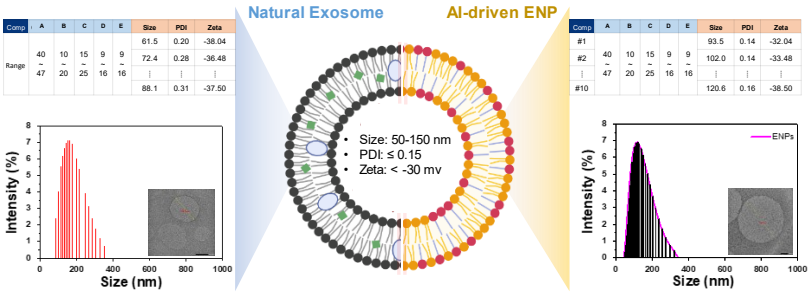


Physical properties on AI-driven EXOLNPs



Case study: *in-vivo* test

Physical properties on AI-driven EXOLNPs

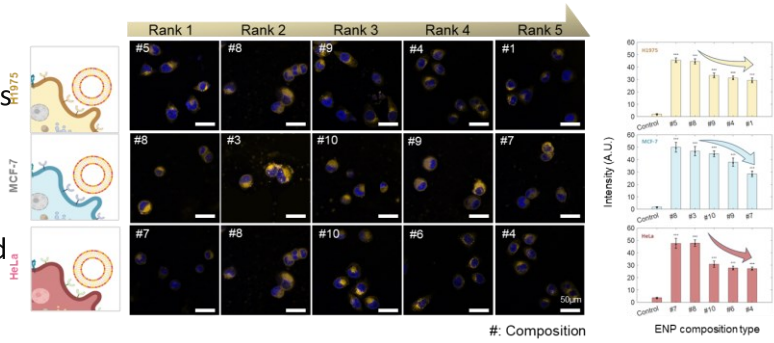


■ EXOAI™-predicted artificial exosomes, when manufactured, were confirmed to possess identical particle size and morphology to natural exosomes.

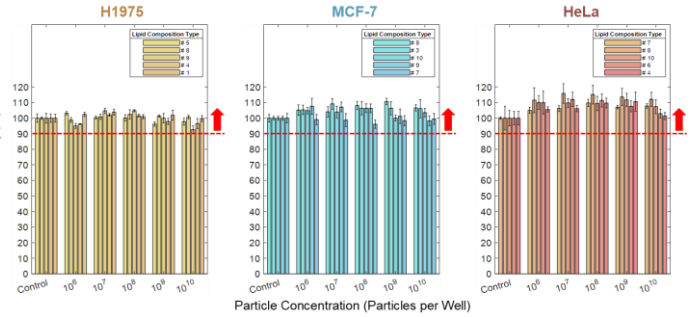
Cellular uptake depending on EXOLNPs composition

■ We evaluated the cellular uptake capability of particles manufactured according to artificial exosome compositions predicted by EXOAI™.

■ The cellular uptake capability indeed varied in alignment with the ranks predicted by EXOAI™.



Cell viability for AI-driven EXOLNPs



■ Additionally, when the manufactured extraordinary lipid nanoparticles were applied to cells at varying concentrations, we observed **over 90% cell viability**, confirming their remarkably **low cytotoxicity**.

History

2021
- Corporate establishment of The DABOM Inc. (Yonsei Univ. Lab-based Startup)

2022
- Secured guarantee from the Korea Technology Finance Corporation (US$ 150k)
- Selected for the 2023–2024 Bio-Medical Technology Development Project by the Korean Ministry of Science and ICT (US$ 330k)

2023
- Honored as Yonsei University's Best Company in Early Startup Package by the Korean Ministry of SMEs and Startups

2024
- **Artificial exosome production method Korean patent application filed**
- Selected for the National Project by the Korean Ministry of Food and Drug Safety (US$ 0.5M)
- Selected for the DeepTech TIPS program by the Korean Ministry of SMEs and Startups (US$ 1.2M)
- Selected as an Exhibitor at the 2025 CES (U.S.) Seoul Pavilion

2025
- **Launching of Exostation™**
- Series A Investment (US$ 3.4M)
- Commercialization Support Program for Advanced Bio-Materials by the Ministry of Trade, Industry and Energy (US$ 15k)

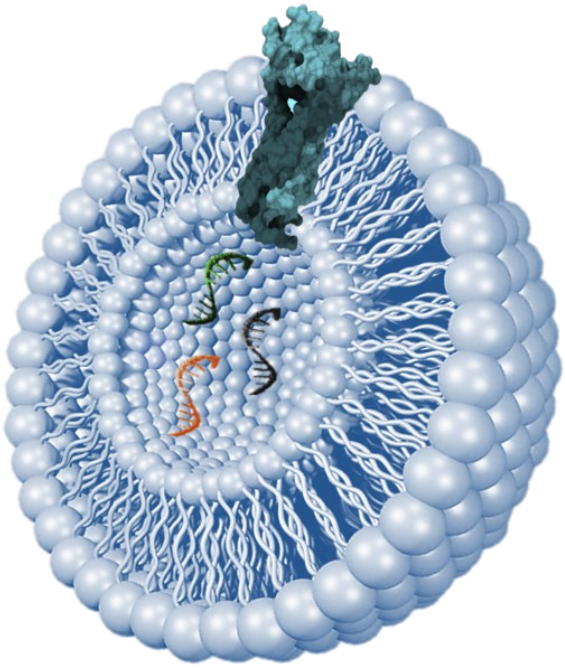
2026
- **Preclinical Study of Exocure™**
- Series B Investment (US$ 13.5M)

2027
- **Clinical Study of Exocure™**
- **Establishment of GMP facilities**
- IPO (Initial Public Offering)

Specification of EXOAI™

	EXOAI™
Computer requirement	3 GHz processor, 4 cores, 8 GB RAM, Geforce RTX 3090ti
Database scale	Based on CAS, ExoCarta, PubMed, Vesiclepedia
Learning algorithm type	Hybrid Least square boosting algorithm (Hybrid-LSBoost)
Hyper parameter	1000-epoch, 500-iteration, leaf node (8)
Input parameters	CMAs (DC-cholesterol, DSSM, DSPE, Cholesterol, DSPS, DSPC, composition)
Output parameters	CQAs (Particle size, PDI, Zeta potential, Encapsulation efficiency)
Natural exosome mimicry rate	95%
Mean squared error	0.01
Correlation coefficient (R^2)	0.99
Prediction time	< 30mins
Subscription	Recurring subscription

We Design Extraordinary Lipid Nanoparticles Inspired by Nature!



the dabom

The Decisive and **A**dvanced **B**io-**O**perator for **M**edicine

The DABOM Inc.

Tel. : +82-2-2123-7767

Homepage: https://www.thedabom.com/

E-mail : contact@thedabom.com

Address: (03722) 211, Engineering Research Park, 50, Yonsei-ro, Seodaemun-gu, Seoul, Republic of Korea